Homework 5 Report

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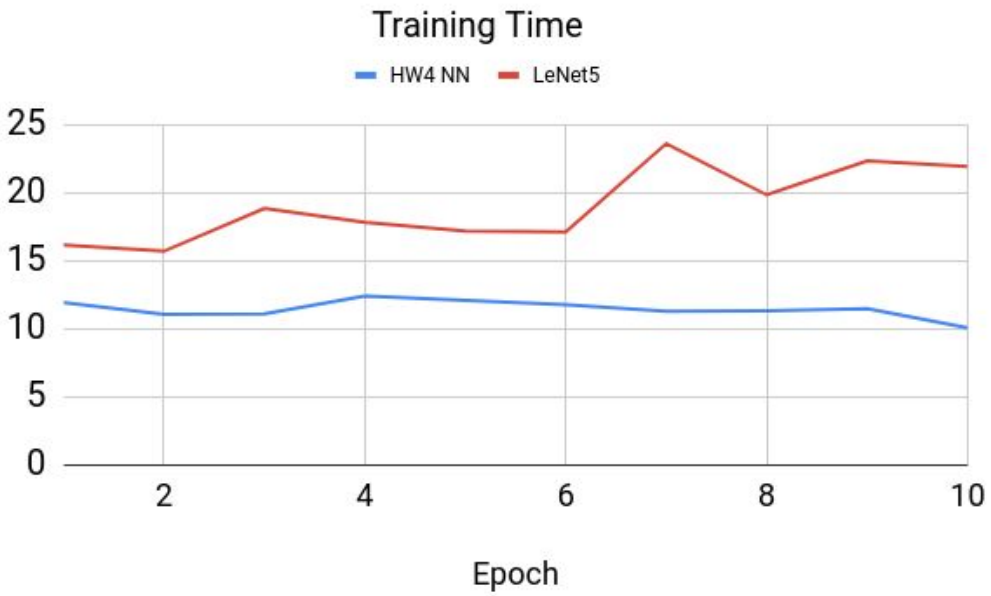
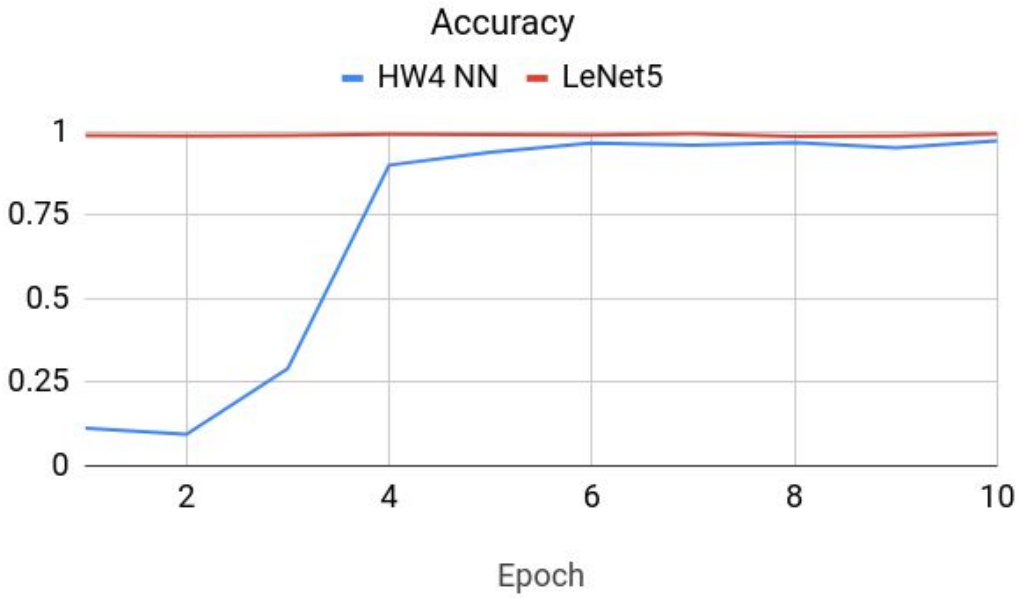
Part A:

$ python img2num.py

Epoch	Training Loss	Validation Loss	Training Time (s)	Accuracy
1	0.009383368142751957	0.015578916931152344	16.160460472106934	0.989
2	0.00290924909622845	0.011369791412353515	15.70374608039856	0.987
3	0.002104443552466061	0.008490464782714844	18.85857367515564	0.988
4	0.0017012331745481788	0.008036939239501953	17.818300008773804	0.992
5	0.0013930712637314476	0.008940970611572266	17.20576024055481	0.991
6	0.0011387822692458939	0.008454015350341798	17.135632038116455	0.99
7	0.0009292978284170204	0.008299227905273437	23.61373233795166	0.994
8	0.0007619545136449233	0.009177607727050782	19.843980312347412	0.986
9	0.0006477928978441317	0.007674630737304688	22.33823251724243	0.987
10	0.00056584422579211	0.007382086181640625	21.937288522720337	0.994

The LeNet5 training & validation loss is compared to the HW4 NN in last homework, LeNet5 converges faster.



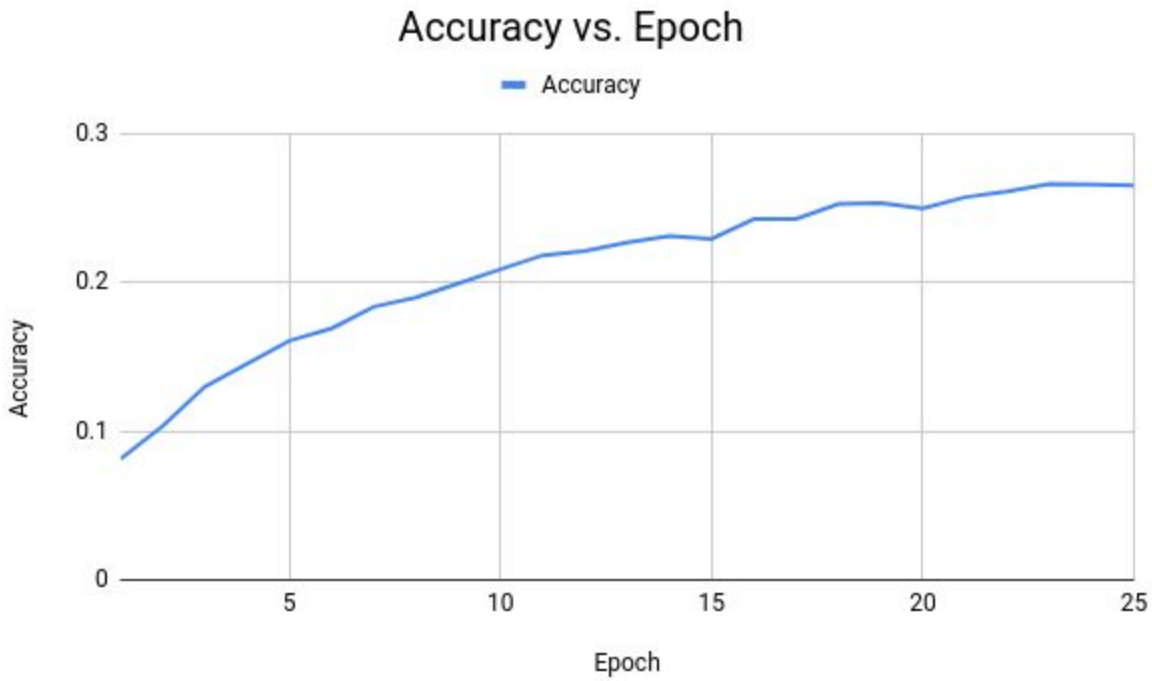


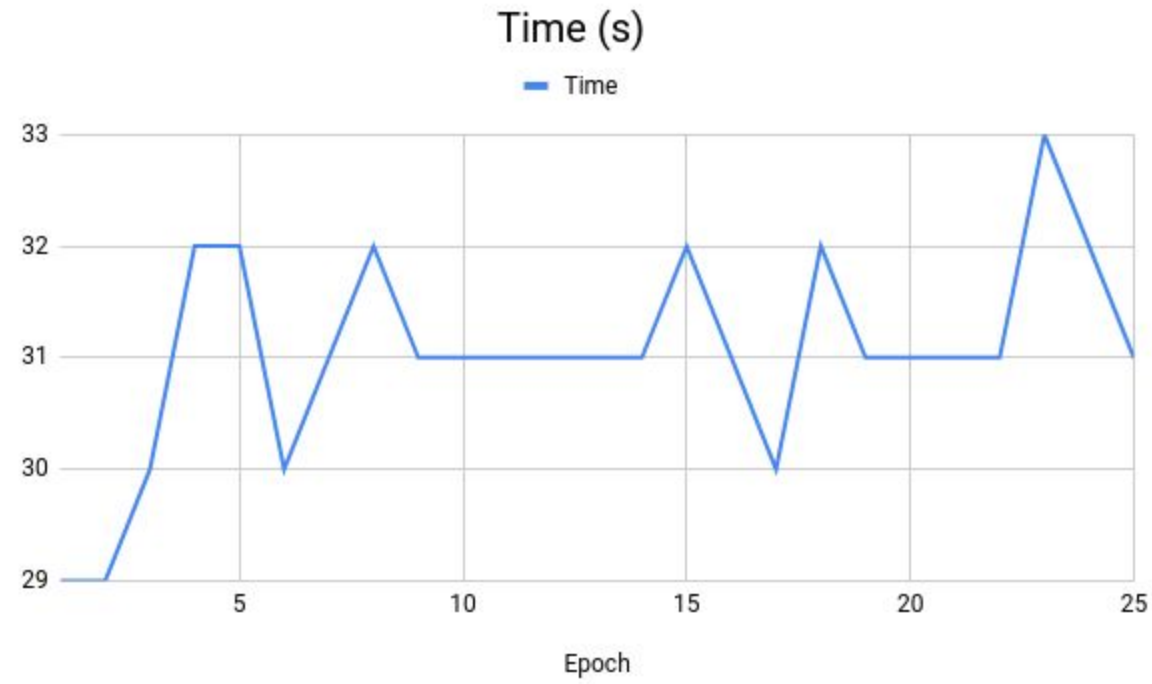
In conclusion, LeNet5 converges faster than HW4 NN

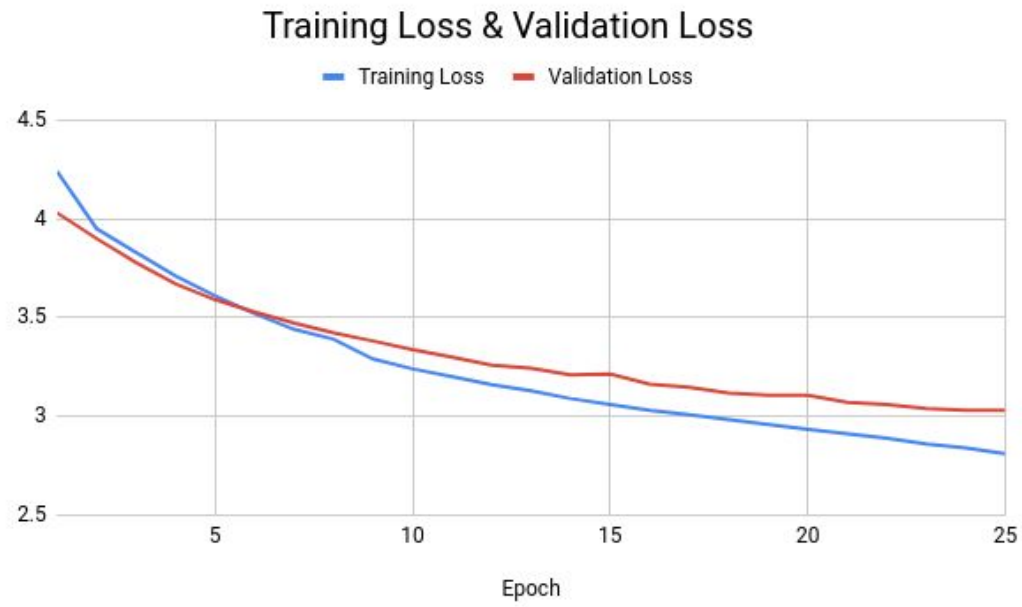
Part B:

$ python img2obj.py

Epoch	Accuracy	Time	Training Loss	Validation Loss
1	0.0813	29	4.24	4.03
2	0.1034	29	3.95	3.9
3	0.1299	30	3.83	3.778
4	0.1452	32	3.71	3.67
5	0.1608	32	3.61	3.59
6	0.169	30	3.52	3.528
7	0.1836	31	3.44	3.472
8	0.1899	32	3.39	3.422
9	0.1993	31	3.29	3.381
10	0.2088	31	3.24	3.338
11	0.2182	31	3.2	3.3
12	0.2212	31	3.16	3.26
13	0.2267	31	3.13	3.244
14	0.2312	31	3.09	3.209
15	0.2291	32	3.06	3.214
16	0.2425	31	3.03	3.163
17	0.2425	30	3.009	3.147
18	0.2525	32	2.984	3.119
19	0.2534	31	2.959	3.107
20	0.2497	31	2.9344	3.106
21	0.2572	31	2.911	3.07
22	0.2612	31	2.889	3.06
23	0.266	33	2.86	3.04
24	0.2656	32	2.84	3.03
25	0.2651	31	2.81	3.03


Accuracy vs. Epoch
Accuracy
0.3
0.2
0.1
0
Accuracy
5
10
15
20
25
Epoch


Time (s)
Time
33
32
31
30
29
5
10
15
20
25
Epoch



These are the inference results returned from the webcam on my laptop.